

July 18, 2012

## Using QECBs for Street Lighting Upgrades: Lighting the Way to Lower Energy Bills in San Diego

Qualified Energy Conservation Bonds (QECBs) are federally-subsidized bonds that enable state, tribal, and local government issuers to borrow money to fund a range of energy conservation projects, including street lighting upgrades, at very attractive rates over long contract terms. As part of the American Recovery and Reinvestment Act (ARRA), the City of San Diego received a \$13.1 million QECB award from the U.S. Department of the Treasury (Treasury). The city leveraged these QECBs to increase the size of a street lighting upgrade project from 10,000 to 39,000 light replacements. The \$18.1 million street lighting upgrade project is expected to save the city over \$2.5 million in avoided energy and maintenance costs.

### QECB Basics

A Qualified Energy Conservation Bond (QECB) is a bond that enables state, tribal and local government issuers to borrow money at attractive rates to fund qualified energy conservation projects.<sup>1</sup> QECBs were initially established by the Energy Improvement and Extension Act of 2008 and issuance capacity was expanded from \$800 million to \$3.2 billion by ARRA. It is estimated that approximately 20 percent of this issuance capacity has been used, leaving approximately \$2.5 billion available to state, local, and tribal governments.<sup>2</sup> A QECB is among the lowest-cost public financing tools because the Treasury subsidizes the issuer's borrowing costs. Issuers may choose between structuring QECBs as tax credit bonds (i.e. bond investors receive federal tax credits in lieu of, or in addition to, interest payments) or as direct subsidy bonds (i.e. bond issuers receive cash rebates from the Treasury to subsidize their interest payments). Both tax credit and direct payment bonds subsidize borrowing costs. Thus far, most QECBs have been issued as direct subsidy bonds, due to lack of investor appetite for tax credit bonds.

---

*This paper is part of the LBNL Clean Energy Financing Policy Brief series. These working papers highlight emerging financing models, important issues that financing programs face, and how these issues are being addressed. To join the email list to receive these policy briefs, please click [HERE](#). The work described in this Policy Brief was funded by the Department of Energy Office of Energy Efficiency and Renewable Energy, Weatherization and Intergovernmental Program under Contract No. DE-AC02-05CH11231. Please direct questions or comments to Mark Zimring ([mzimring@lbl.gov](mailto:mzimring@lbl.gov)). The information in this policy brief is for informational purposes only—potential issuers should consult the U.S. Department of Treasury's QECB guidance and their bond counsels.*

<sup>1</sup> A full list of eligible projects available here: <http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/QECB.html>

<sup>2</sup> Overview of QECB issuances available here: [http://www.energyprograms.org/wp-content/uploads/2012/03/QECB\\_Memo\\_6-8-2.pdf](http://www.energyprograms.org/wp-content/uploads/2012/03/QECB_Memo_6-8-2.pdf)

## The Benefits of Street Lighting Upgrades

Street lighting costs are significant general fund expenses for many U.S. cities, often accounting for 10 to 40 percent of a city's total annual electricity bill.<sup>3</sup> Concerns about rising energy prices and the emergence of new high efficiency street lighting technologies have led an increasing number of municipal governments to invest in street lighting system upgrades. Replacing older technologies, typically high and low pressure sodium vapor (HPS & LPS) street lights, with more advanced street lighting technologies (e.g. light-emitting diodes, induction lighting) can reduce street light energy consumption by up to 40 percent, improve color rendition and visibility, and reduce maintenance costs due to the longer life of many of the new technologies, which results in less frequent lamp replacements.<sup>4</sup> In San Diego, the city is replacing HPS and LPS street lights (with expected lives of four to six years) with induction lighting that has an expected lifetime of twenty years (San Diego's lighting supplier provided a 10.5 year warranty) and typical per-light energy savings of 40 percent.

## Tapping into Support from the American Recovery and Reinvestment Act (ARRA)

The City of San Diego initiated plans to begin upgrading its 43,000 HPS & LPS street lights through their Broad Spectrum Street Light Conversion Program (BSSLCP). City staff partnered with their utility, San Diego Gas & Electric to test emerging outdoor lighting technologies and develop minimum performance standards. Following the completion of this study, San Diego used a \$2 million ARRA-funded Energy Efficiency and Conservation Block Grant (EECBG) and a \$3 million loan (3 percent interest, 15 years) from the California Energy Commission to launch the first phase of the street light replacement initiative in September 2011. The \$5 million project targeted 10,000 street light replacements. After receiving a \$13.1 million QECB allocation from the State of California, San Diego opted to use these low-cost funds to expand the BSSLCP to 39,000 total street light replacements (approximately 60 percent of the city's street lights). In addition, \$1.8 million of utility rebates (approximately 10 percent of the overall project cost) enhanced the project's economics. When completed, the \$18.1 million street lighting upgrade project is expected to save the city over \$2.5 million annually (\$1.79 million in energy costs and \$744,000 in avoided maintenance costs).<sup>5</sup>

## QECBs for Street Lights: Taking a Calculated Risk

When city staff first examined QECBs, they found that no QECBs had yet been issued to fund street lighting projects and that these improvements were not explicitly listed as a qualified conservation purpose eligible for funding with QECB proceeds as laid out in the Federal legislation. However, city staff decided that efficient lighting was compatible with the Green Community Program (GCP) provision of the legislation. GCPs are a qualified use of QECB proceeds that are undefined in Federal statute.<sup>6</sup> While the city did not receive assurances from the Treasury that street lighting improvements would be eligible for the QECB interest rate subsidy, the city felt confident that the project met the spirit of the law.

<sup>3</sup> Source: Clinton Climate Initiative. <http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/i/los-angeles-street-lighting>

<sup>4</sup> Advanced Street Lighting Technologies Assessment Project report available here: <http://www.sandiego.gov/environmental-services/energy/pdf/100104assessment.pdf>

<sup>5</sup> The city pays a flat annual fee to SDG&E based on the wattage and technology of each streetlight (the street lights are not individually metered), so there is certainty to how much the city will save in energy costs.

<sup>6</sup> A description of green community programs can be found in the February 12, 2009 Congressional Record. While this document does not exclude street lighting upgrades, it also does not explicitly state that they are eligible uses of QECB proceeds. <http://www.congressonrecord.com/page/H1473>

The city mitigated its downside exposure by structuring the project economics such that if the Internal Revenue Service later determined that this was not an eligible project, the city would still have a cost-effective project even without the QECB subsidy (e.g. the energy and maintenance savings would still be larger than the equipment cost plus higher bond interest rate).

Subsequently, in June 2012, the Treasury and Internal Revenue Service clarified that street light upgrades are, in fact, an eligible use of QECB proceeds under the “Green Community Program” designation, eliminating this uncertainty for current and potential QECB issuers.<sup>7</sup>

## QECBs as Lease-Purchase Agreements: Flexible Financing to Meet City Needs

San Diego’s QECBs were structured as a private placement with Bank of America. Private placements are direct sales of bonds to a single (or small number of) qualified investor(s)—these placements are typically faster and less costly than public bond offerings. San Diego’s QECBs have been designed as an equipment lease-purchase agreement, in which the underlying security for the bonds is the installed street lights that the QECBs are funding. In other words, the city uses the street lights, but Bank of America technically owns the fixtures until the city repays the bonds. San Diego pays 6.16 percent interest on the 15 year debt and receives a cash subsidy from the Treasury that reduces the net interest rate it pays to 2.88 percent. The city’s issuance costs were \$195,000 (1.5 percent of bond proceeds). The agreement was structured such that the \$13.1 million QECB proceeds were deposited into an escrow account, and there will be several distributions from this account in order to better align funding availability with the lighting contractor’s capacity to install the new lighting fixtures (the contractor is targeting a run rate of 1,500 lighting upgrades a month). To date, 26,500 total lighting upgrades have been completed (including those funded with the initial \$5 million upgrade initiative).

## Planning Ahead is Critical

City staffers emphasize that street light upgrades necessitate a significant amount of up-front work. Exterior lighting is a very personal issue to city residents. Tom Blair, Deputy Director, City of San Diego Environmental Services for Energy Sustainability and Environmental Protection noted that “10 percent of residents won’t like whatever lighting you put in, so you need to be able to defend your decisions and think about remediation options, like shields to keep lighting from intruding into people’s bedrooms, during project design.” In addition, many city and non-city agencies have some influence over city street lighting, making seemingly simple issues like knowing which street lights are owned by the city more complex. For example, major state highways run through the city of San Diego, and the lights on the on/off ramps are owned and operated by the state’s transportation authority. As part of the project, San Diego has created a new GPS database of the exact location of all city-owned street lights to make future projects easier. Blair added, “The technical details of these projects are really extensive, and it is important to be on top of them.”

## Other QECB Issuances for Street Lighting

A number of cities have followed San Diego’s lead and used QECBs to fund street lighting upgrades:

### *Richmond, CA*

---

<sup>7</sup> Overview of the Treasury guidance available here: <http://financing.lbl.gov/reports/qecb-guidance.pdf> Full guidance available here: <http://www.irs.gov/pub/irs-drop/n-12-44.pdf>

In December 2010, the City of Richmond, CA sold \$1.05 million of 15 year QECBs to Bank of America as a lease-purchase agreement. Richmond's sustainability coordinator, Adam Lenz, noted that QECBs represented a, "good opportunity to secure low interest funding for necessary infrastructure improvements." The notes were priced at 6.79 percent, and the city is receiving a 4.06 percent interest rate subsidy, for a net interest rate of 2.73 percent. The city's bond issuance costs were \$210,000 (two percent of bond proceeds). Several projects were funded with the QECB proceeds including energy efficiency projects on city facilities and street lighting. Over \$500,000 from the issuance was used for street lighting upgrades identified in the city's street light master plan as being high priorities, including the replacement of decades-old incandescent street lighting with LED fixtures. These replacements are expected to yield an average energy savings of 45 percent, reduced maintenance costs, and better lighting for high-crime neighborhoods. Some of the upgrades don't have rapid paybacks, but city staff suggested that the projects require new—and necessary—infrastructure upgrades and that the low-cost QECB funding helps to reduce their cost to the city. As part of the project, Richmond has also received approximately \$75,000 of incentives from its utility, Pacific Gas & Electric, and negotiated lower rates on non-metered street lights.

Lenz pointed out that that working with the city's financial department from project design outset was critical to their support in difficult economic times, "We pay \$3 million a year for electricity and gas, and street light expenditures are a third of our energy costs—which is staggering for a city that manages over 50 facilities including a waste treatment plant. Street lights are easy to replace, pay for themselves, and have substantial health and wellness co-benefits that our city manager has prioritized; people are more likely to come to your business districts if they're well-lit and modernized, and better lighting means safer streets that people are more comfortable walking at night." Richmond has also used ARRA funds and a \$621,000 California Energy Commission loan (3 percent interest, 15 years) to support the project and anticipates that, combined with QECB funds, these monies will be used to upgrade over 1,500 street lights.

### *Las Vegas, NV*

In May 2011, the city of Las Vegas, NV issued a \$5.87 million 15 year QECB to Bank of America. Of this issuance, \$2.9 million of the QECB proceeds were used to complete approximately 6,600 LED street light upgrades. The bond was sold to Bank of America as an installment purchase contract secured to the light fixtures.<sup>8</sup> These upgrades are expected to yield annual energy savings of \$350,000 and annual maintenance savings of approximately \$50,000. These upgrades are part of a larger initiative in which the city plans to replace almost all of its 52,000 street lights as part of its five year capital improvement plan. The cost of issuing the QECBs was \$117,486 (two percent of bond proceeds).

---

<sup>8</sup> An installment purchase contract is a standard agreement with a vendor to acquire, rather than lease, property (e.g. street lights) in exchange for a commitment to make specified future payments.

## Resources

<b>Program Contacts</b>	
<b>San Diego</b>	Tom Blair Department of Energy, Sustainability and Environmental Protection <a href="mailto:tblair@sandiego.gov">tblair@sandiego.gov</a>
<b>Richmond</b>	Adam Lenz Sustainability Coordinator <a href="mailto:Adam_Lenz@ci.richmond.ca.us">Adam_Lenz@ci.richmond.ca.us</a>
<b>Las Vegas</b>	Marco Velotta City Planner <a href="mailto:mvelotta@lasvegasnevada.gov">mvelotta@lasvegasnevada.gov</a>
<b>QECB Street Light Resources</b>	
<b>U.S. Department of Energy (DOE)</b>	DOE Municipal Solid-State Street Lighting Consortium <a href="http://www1.eere.energy.gov/buildings/ssl/consortium.html">http://www1.eere.energy.gov/buildings/ssl/consortium.html</a>
<b>San Diego</b>	Advanced Lighting Technologies Assessment Project Report <a href="http://www.sandiego.gov/environmental-services/energy/pdf/100104assessment.pdf">http://www.sandiego.gov/environmental-services/energy/pdf/100104assessment.pdf</a> Street Light Conversion Project Request for Proposal (RFP) <a href="http://financing.lbl.gov/reports/San-Diego-Street-Light-RFP.pdf">http://financing.lbl.gov/reports/San-Diego-Street-Light-RFP.pdf</a> Various Bond Issuance Documents Including the QECB Lease-Purchase Agreement <a href="http://financing.lbl.gov/reports/San-Diego-QECB-Issuance-Documents.pdf">http://financing.lbl.gov/reports/San-Diego-QECB-Issuance-Documents.pdf</a>
<b>Richmond</b>	Various Bond Issuance Documents Including the QECB Lease-Purchase Agreement <a href="http://financing.lbl.gov/reports/Richmond-QECB-Issuance-Documents.pdf">http://financing.lbl.gov/reports/Richmond-QECB-Issuance-Documents.pdf</a>
<b>Las Vegas</b>	Various Bond Issuance Documents Including the QECB Installment Purchase Agreement <a href="http://financing.lbl.gov/reports/Las-Vegas-QECB-Issuance-Documents.pdf">http://financing.lbl.gov/reports/Las-Vegas-QECB-Issuance-Documents.pdf</a>
<b>General QECB Resources</b>	
DOE QECB Website <a href="http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/qecb.html">http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/qecb.html</a> LBL QECB Web Portal <a href="http://financing.lbl.gov">http://financing.lbl.gov</a> To request technical assistance on QECBs, send an email to <a href="mailto:TechnicalAssistanceProgram@ee.doe.gov">TechnicalAssistanceProgram@ee.doe.gov</a>	